Investing in Spill Prevention

Has it Reduced Vessel Spills and Accidents in Washington State?

Dagmar Schmidt Etkin, Ph.D.

Environmental Research Consulting

&

Jon Neel

Washington State Department of Ecology

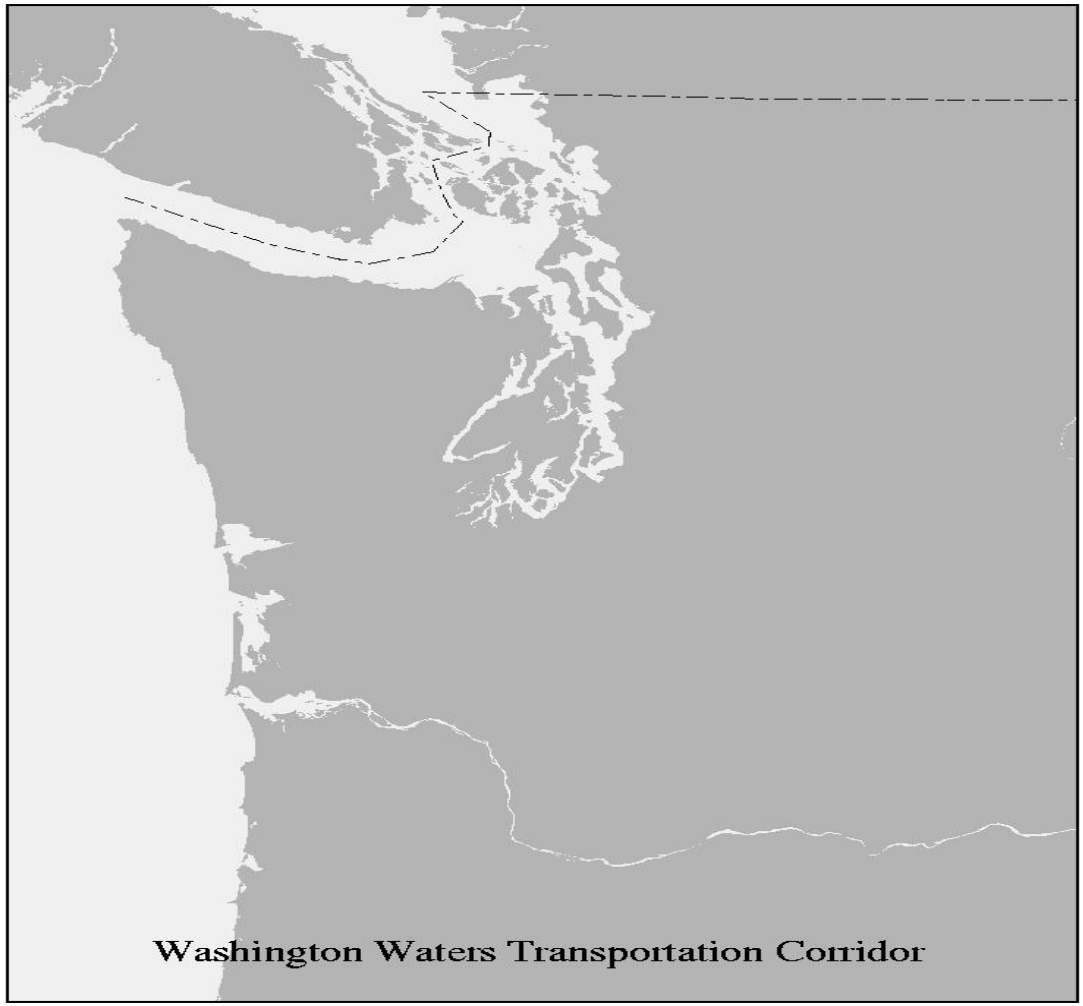
Presentation Outline

- Introduction
- Vessel Oil Spill Risk in Washington State
- Overview of the State Program
- Study Methodology
- Results
- Conclusions

Washington State - *Setting*

- Renowned for its high quality of life. The public demands a high level of environmental protection.
- Economically dependent on its marine natural resources *and* on Pacific Rim trade.
- Principal waterways - Puget Sound and the Columbia River.
- 5 oil refineries process crude oil.

Marine Transportation Corridors: Strait of Juan De Fuca & Puget Sound *(shared with British Columbia)*, Columbia River *(shared with Oregon)*



Washington State - *Vessel Traffic*

- 15.1 Billion gallons of oil moved through *Puget Sound* in 1999 (all vessels).
- Half of this volume is crude oil transported to refineries in Washington State.
- Vessels transiting Washington waters (2000):

  14,426 Cargo & Passenger vessels;

  1,644 Oil Tankers;

  7,928 Oil Barges.

Risk = *Probability* x *Consequences*

- Probability of Spills - A 1999 Coast Guard study estimated the probability of a vessel oil spill over 10,000 gallons in Puget Sound is 1 every 5 years. This probability estimate is generally consistent with historical data.

- Consequences of Spills are Increasing - 1999 study found that the cost of a major oil spill is about $1,000/gallon. The public places an increasing value on the natural environment and their quality of life.

Values Affected by Oil Spills

- Salmon and shellfish aquaculture.
- Tribal cultural and economic values.
- Commercial fishing.
- Recreational boating and fishing.
- Private property.
- Tourism.
- Parks, refuges, National Marine Sanctuary.
- Maritime commerce.

Recent Major Vessel Oil Spills

[*Volume in gallons*]

- 1984 - SS Mobil Oil - Grounding - 200,000
- 1985 - Arco Anchorage T/V- Grounding - 239,000
- 1988 - Olympic Tug & Barge - Capsize - 70,000
- 1988 - Nestucca Barge - Drift/Collision - 231,000
- 1991 - Tenyo Maru Fishing - Collision - 400,000+
- 1994 - Crowley 101 Barge - Grounding - 27,000

Washington State Oil Spill Program

Requirements established in 1990 & 1991

- Tank vessel spill prevention plans (repealed per "Intertanko" US Supreme Ct. decision);
- Vessel inspections;
- Vessel bunkering procedures;
- Spill response plans for vessels 300+ GTs;
- Facility spill prevention & response plans;
- Financial responsibility for spill damages, clean-up and natural resource damages; and
- Rescue tug at Neah Bay.

Rescue Tug *Barbara Foss*

Neah Bay Berth

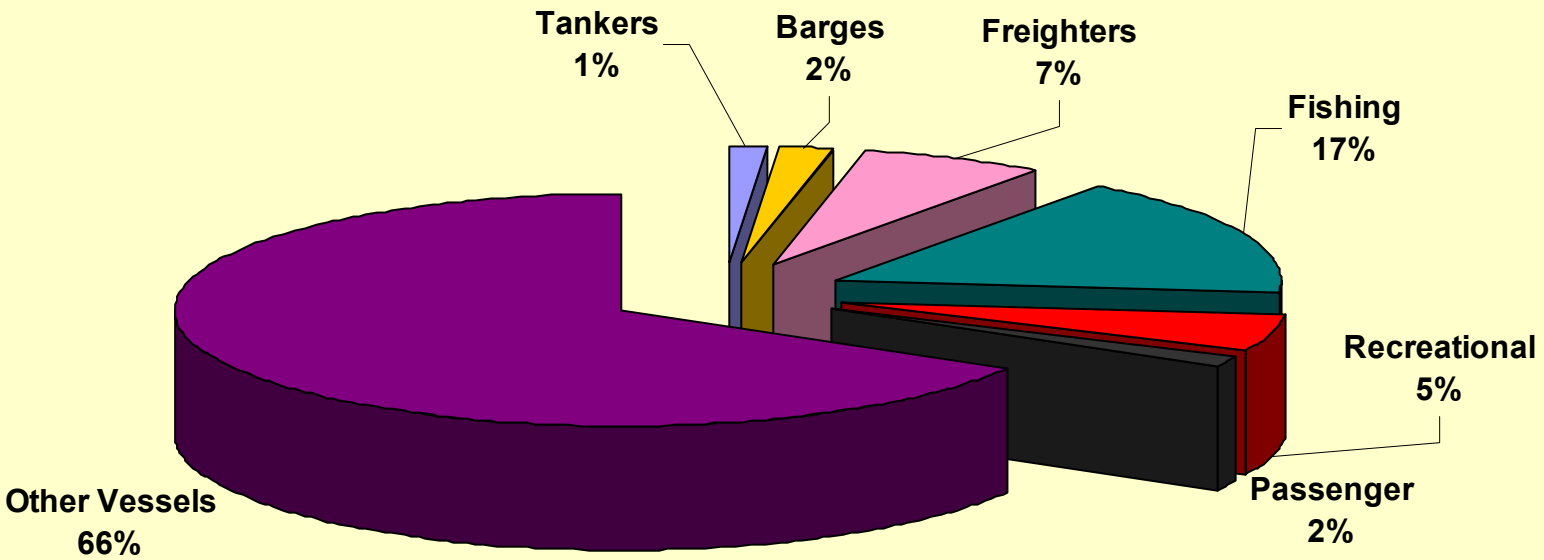
Study Methodology

- Data - US Coast Guard Marine Casualty database, Environmental Research Consulting database; Washington State data, US Army Corps of Engineers, Lloyds Maritime Information.
- Compared data on Washington State with data from other coastal states with similar vessel transit and port activity and with national averages.
- Analyzed oil spill trends over time.

Results

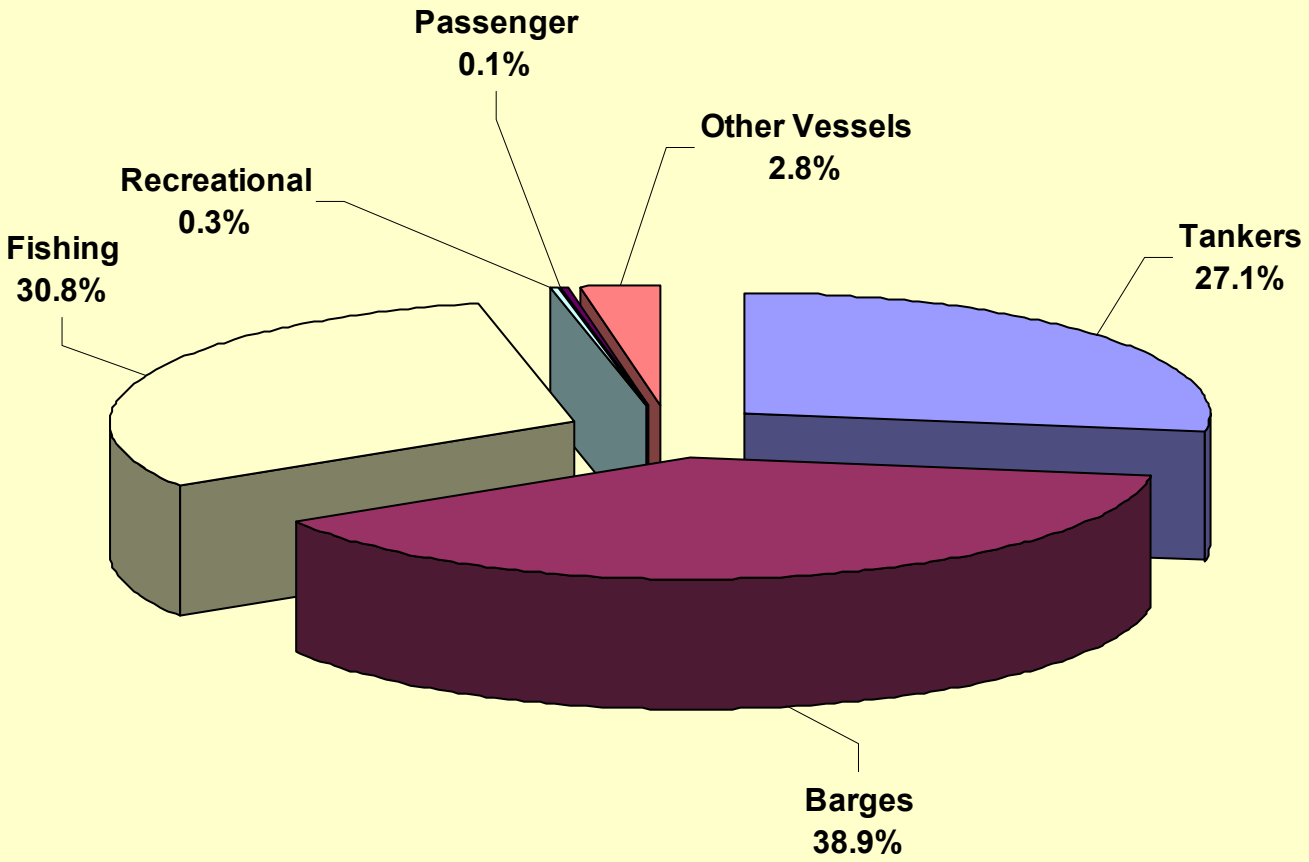
Relative Percentages of Numbers of Oil Spills Into Washington State Waters By Vessel Type (1985-1999)

(Environmental Research Consulting Database)

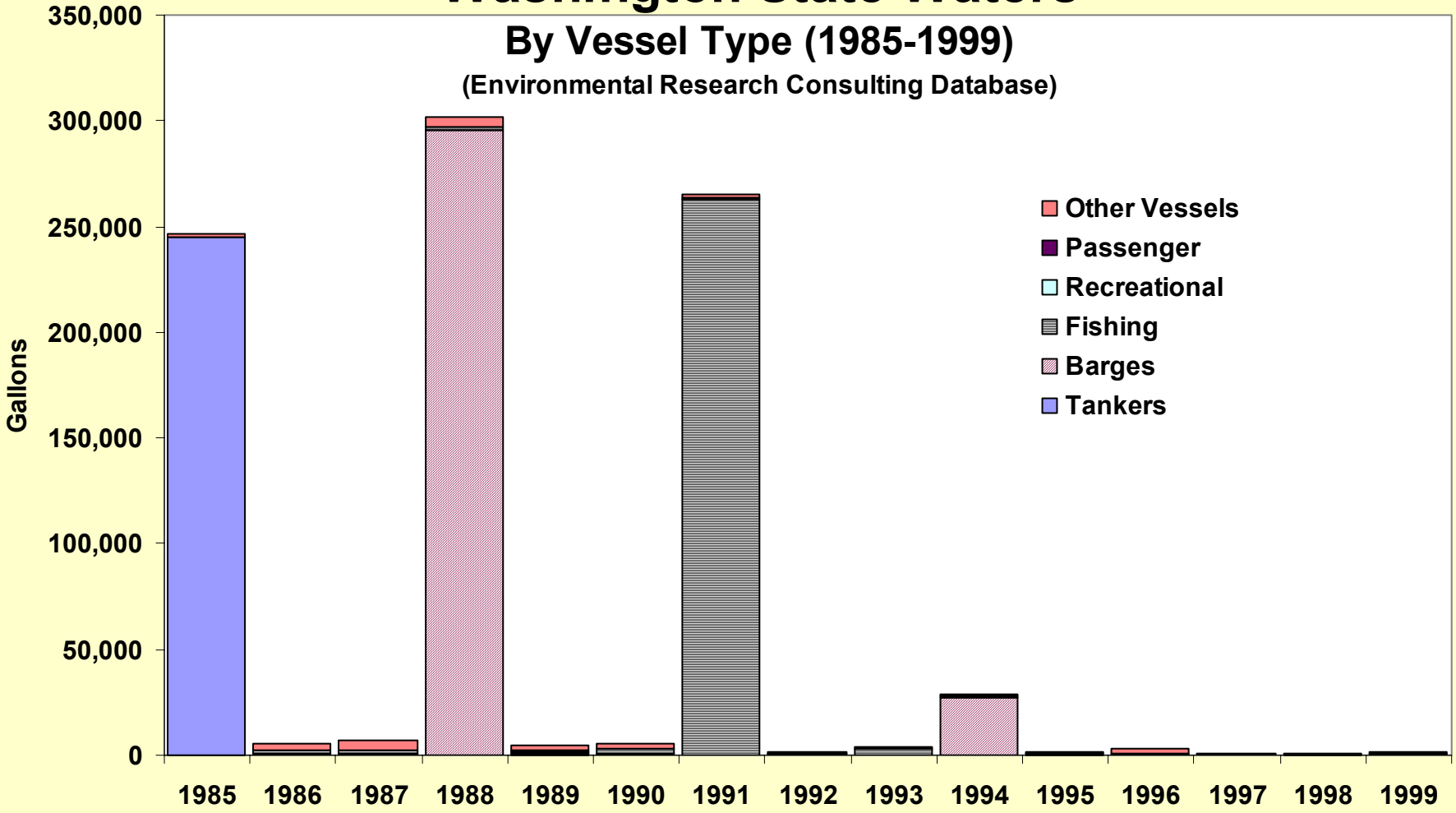


Amount of Oil Spilled in Washington Waters (1985-1999)

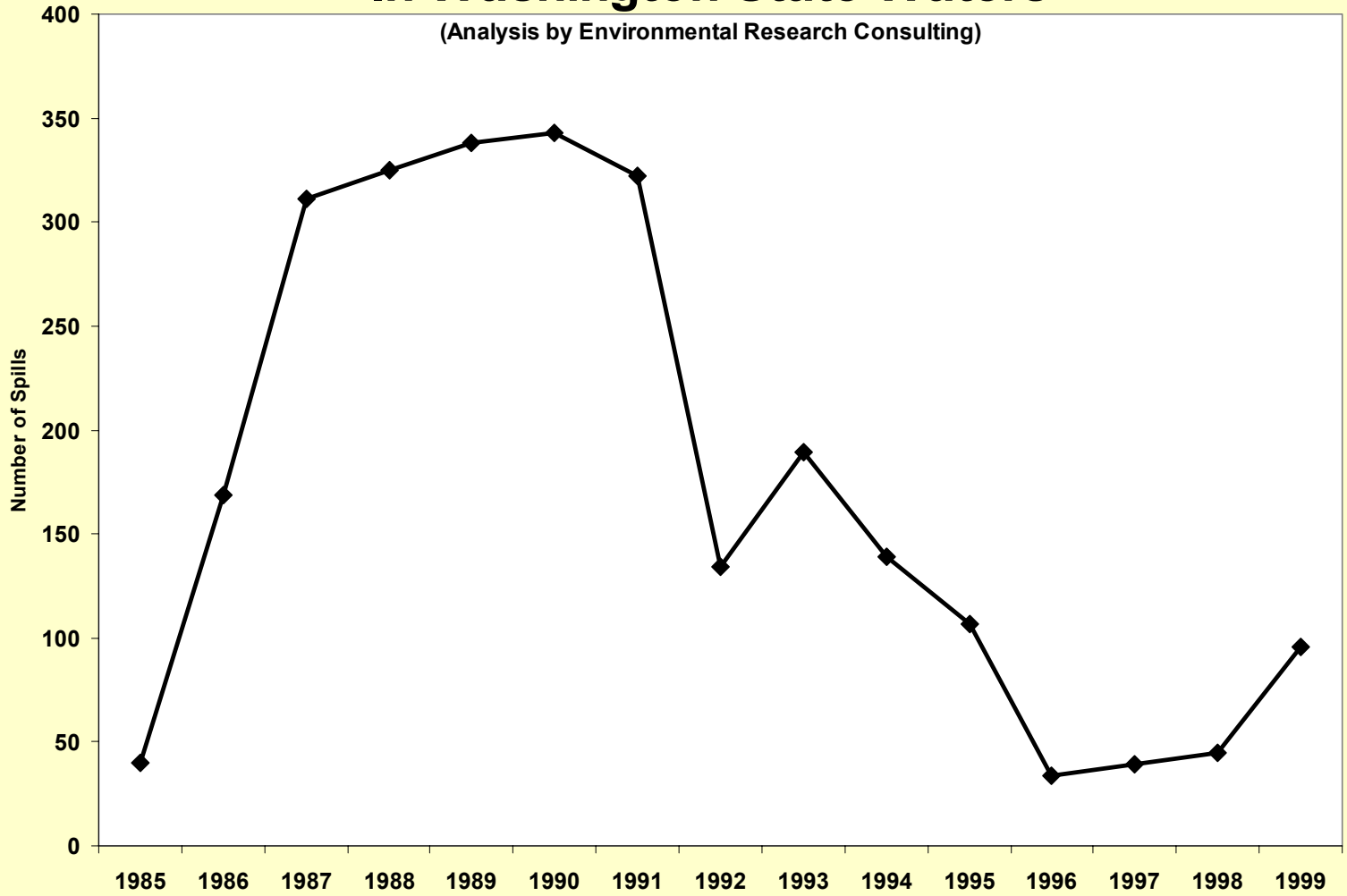
(Environmental Research Consulting Database)



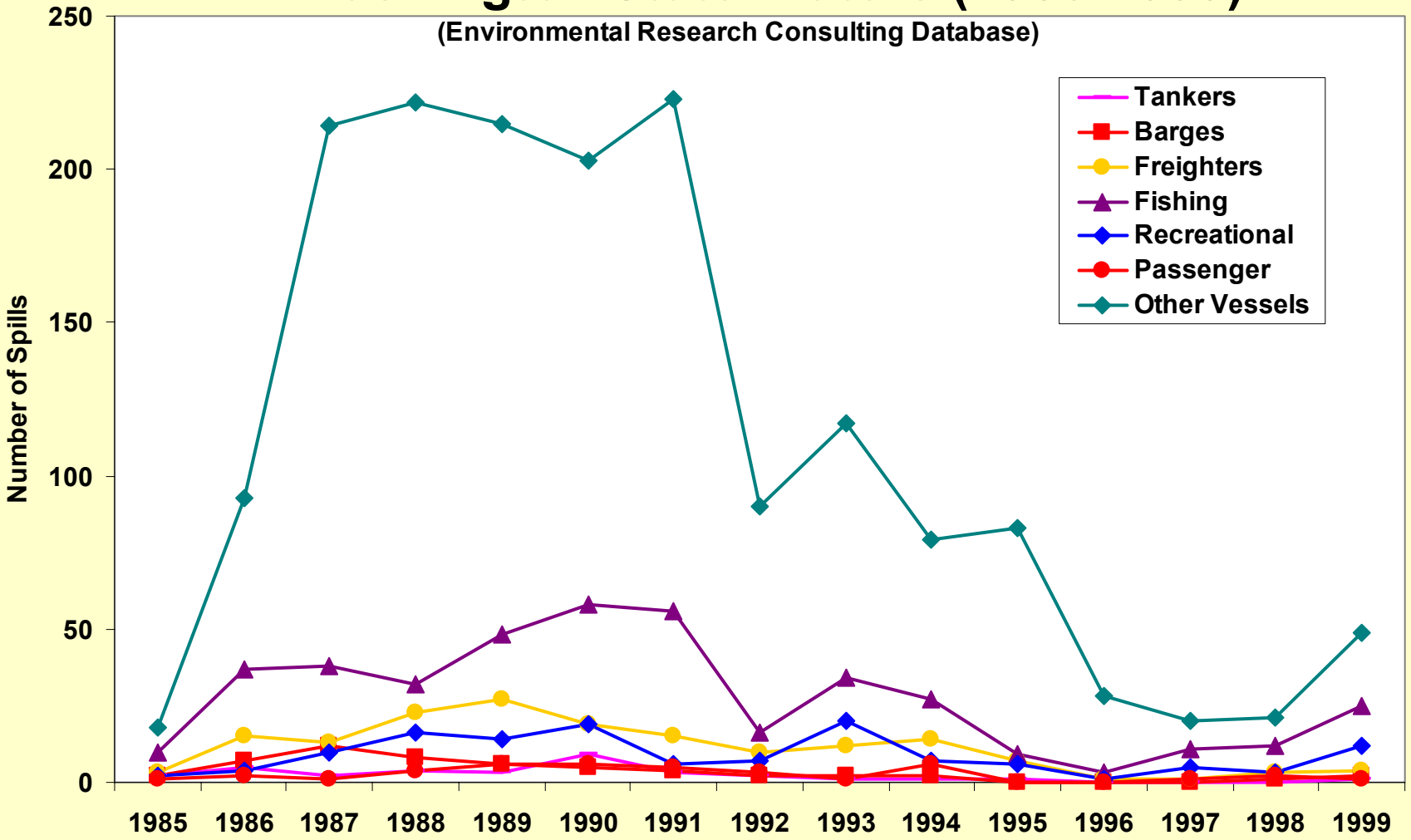
Total Amount of Oil Spilled By Vessels in Washington State Waters



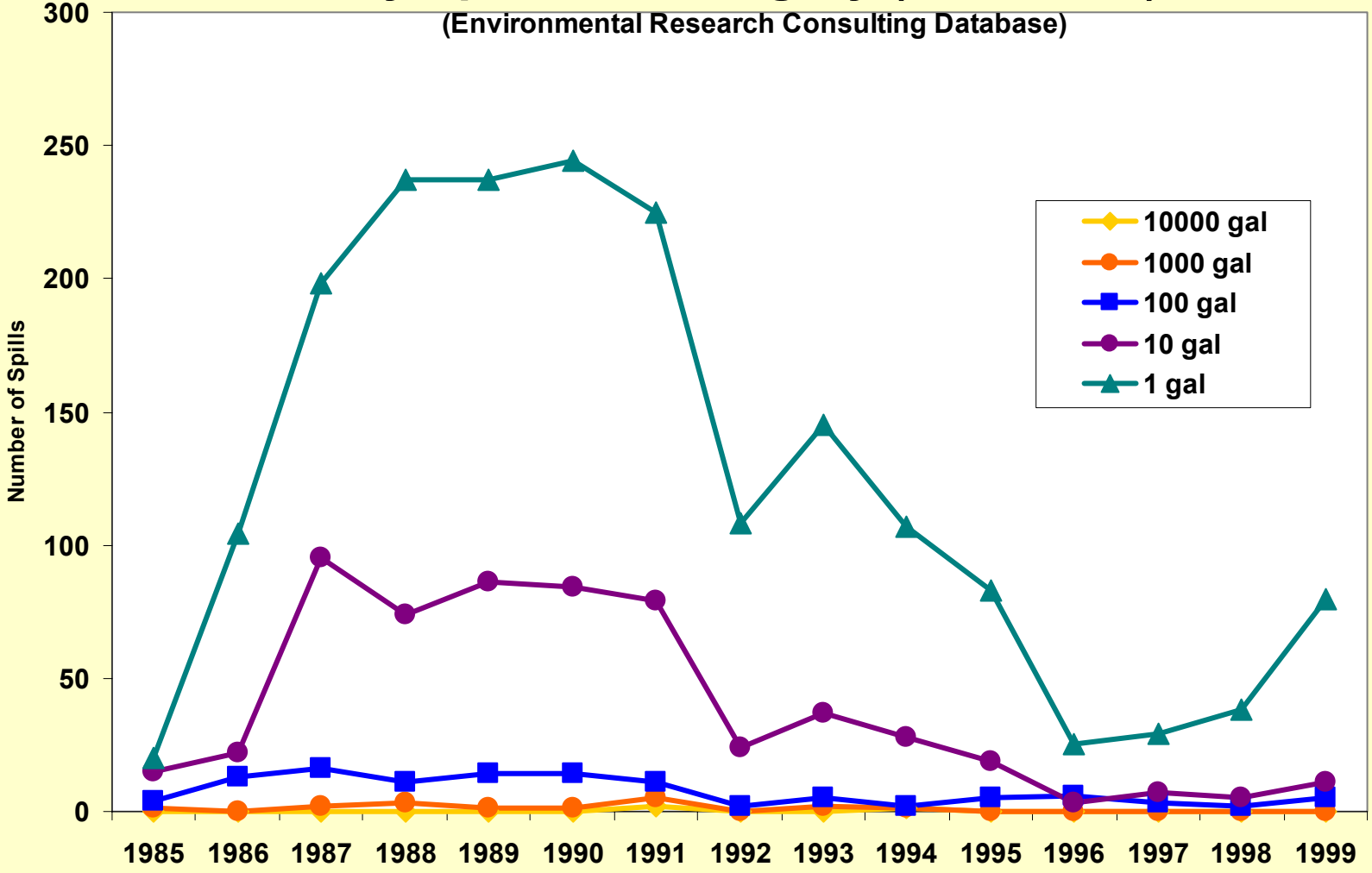
Annual Number of Oil Spills (1+ Gallons) In Washington State Waters



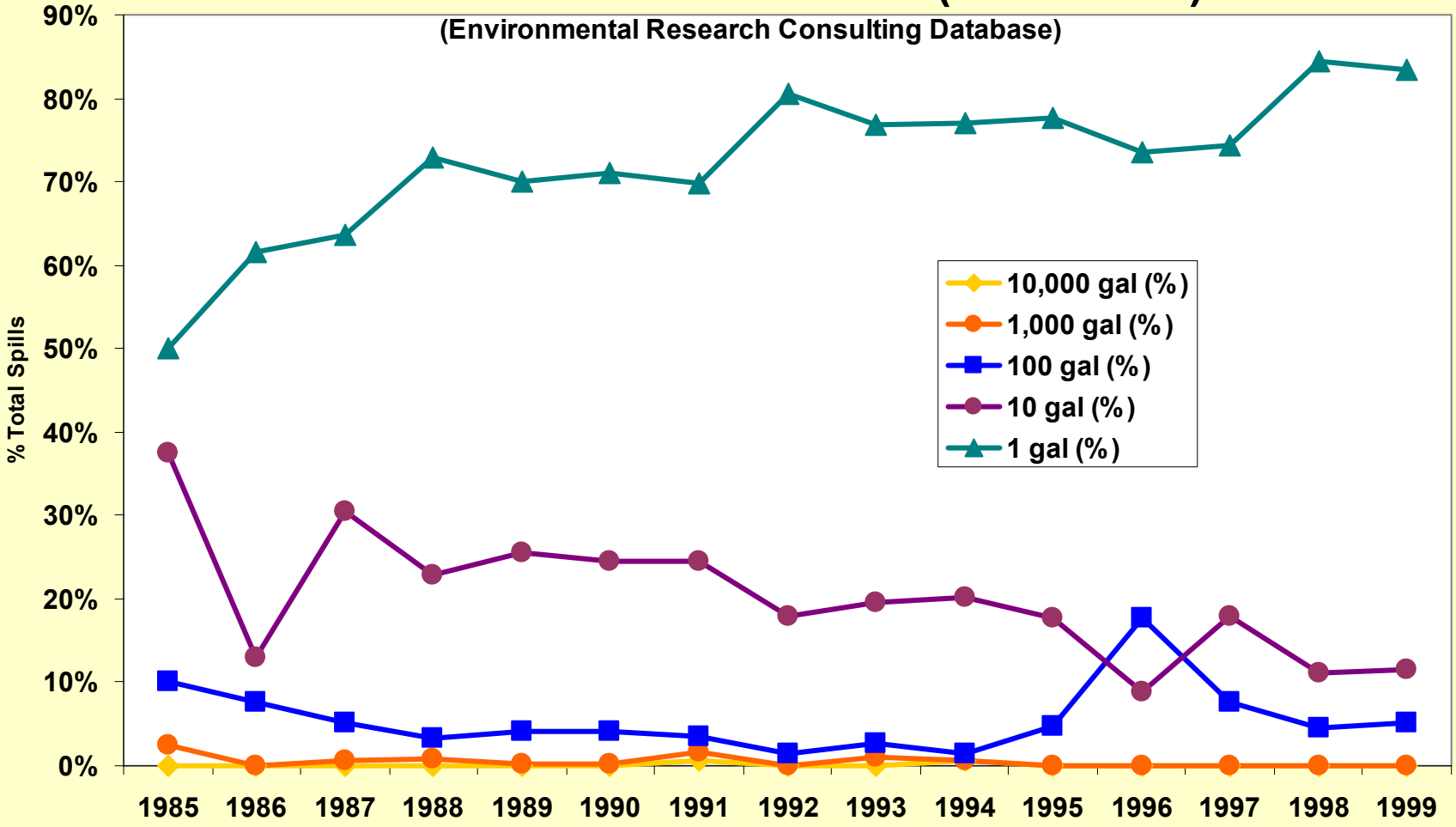
Annual Number of Vessel Oil Spills In Washington State Waters (1985-1999)



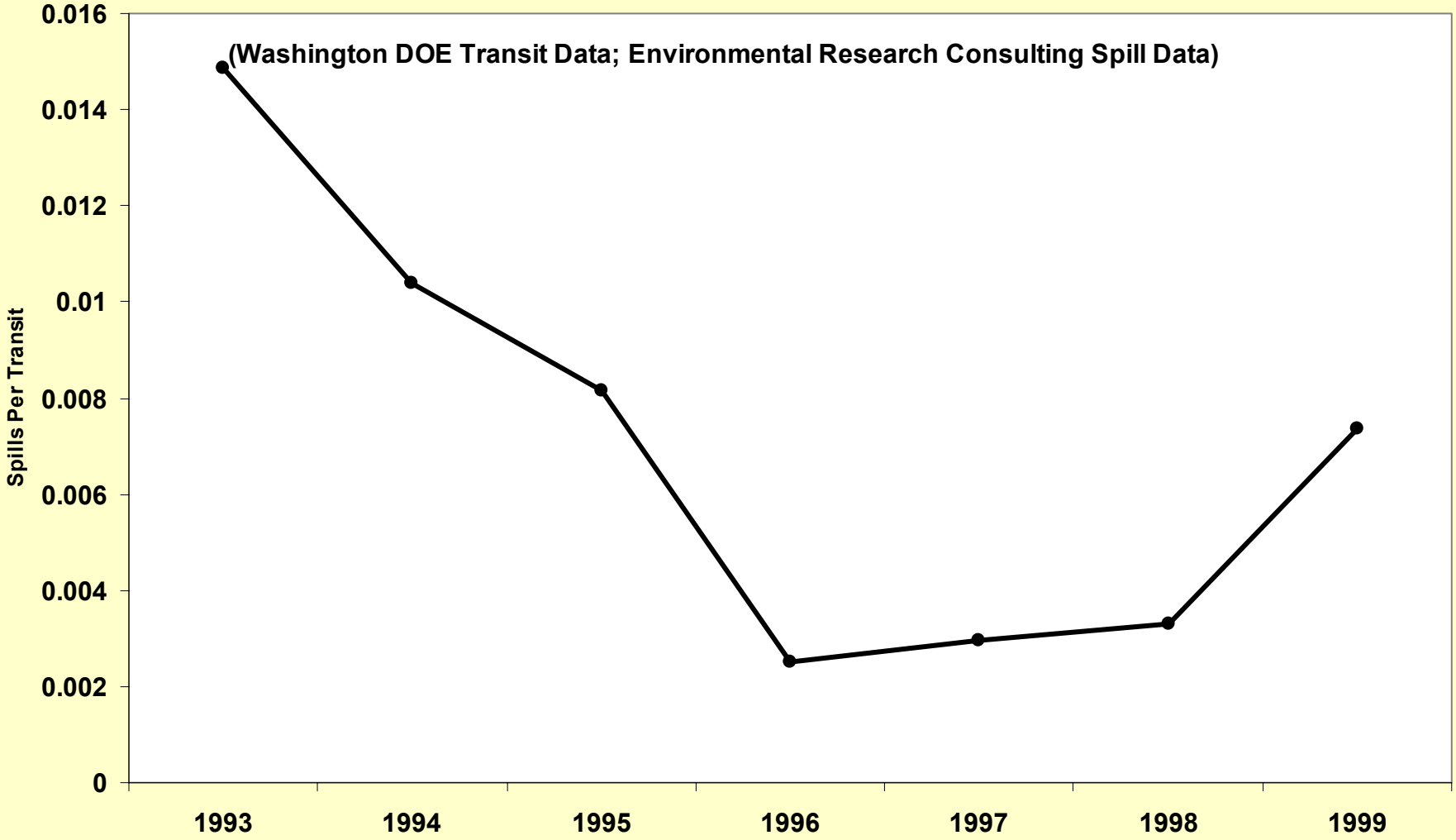
Number of Vessel Oil Spills In Washington State By Spill Size Category (1985-1999)



Percentage of Washington State Vessel Oil Spills In Differerent Size Classes (1985-1999)



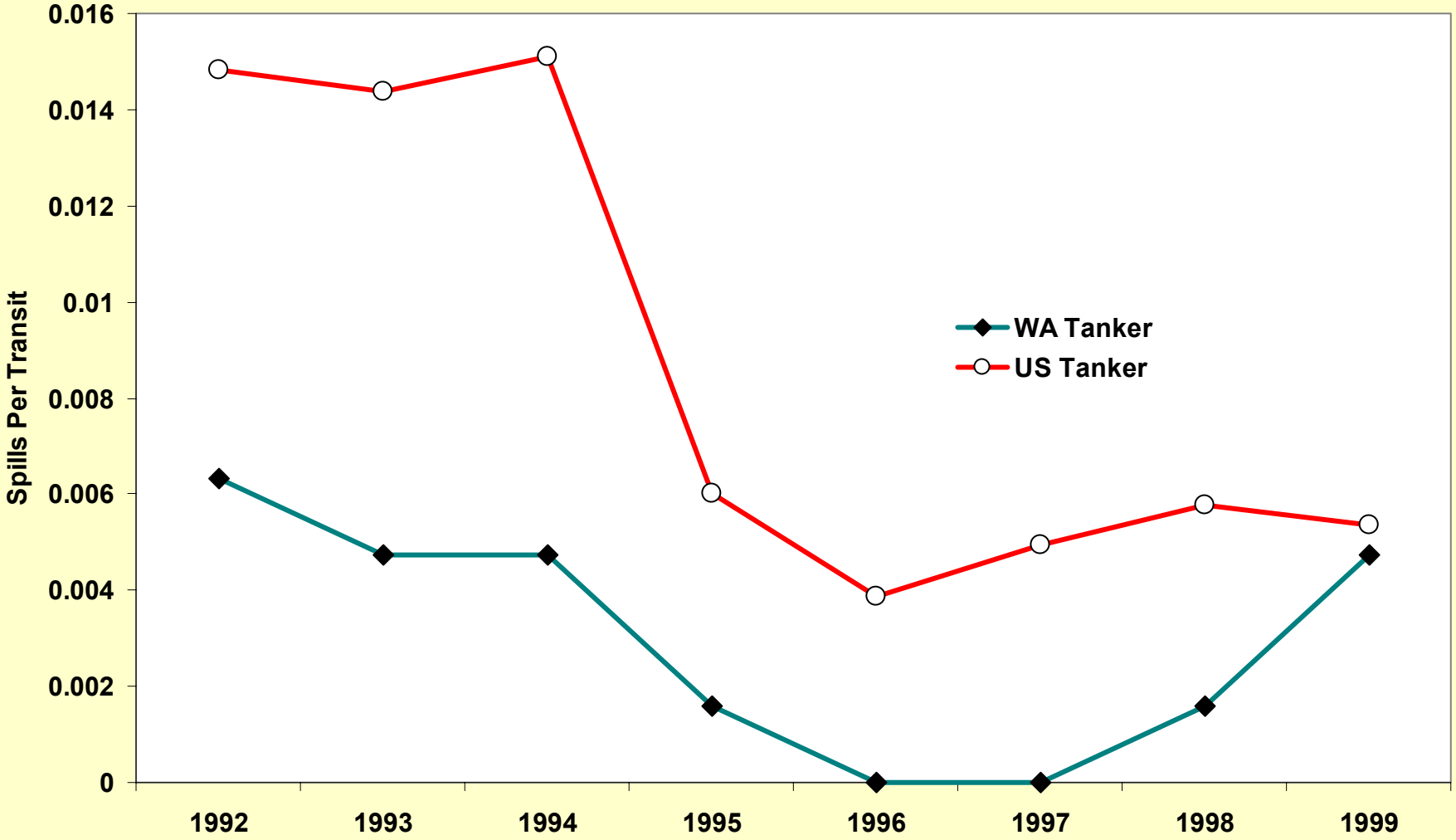
Annual Oil Spills Per Transit (All Vessel Types) (1993-1999)



Washington State Vessel Accidents 1994-2000			
Accident Type	**No Oil Spill**	**With Oil Spill**	**Total Incidents**
Grounding	5	4	9
Allision	6	0	6
Collision	4	2	6
Total	**15**	**6**	**21**

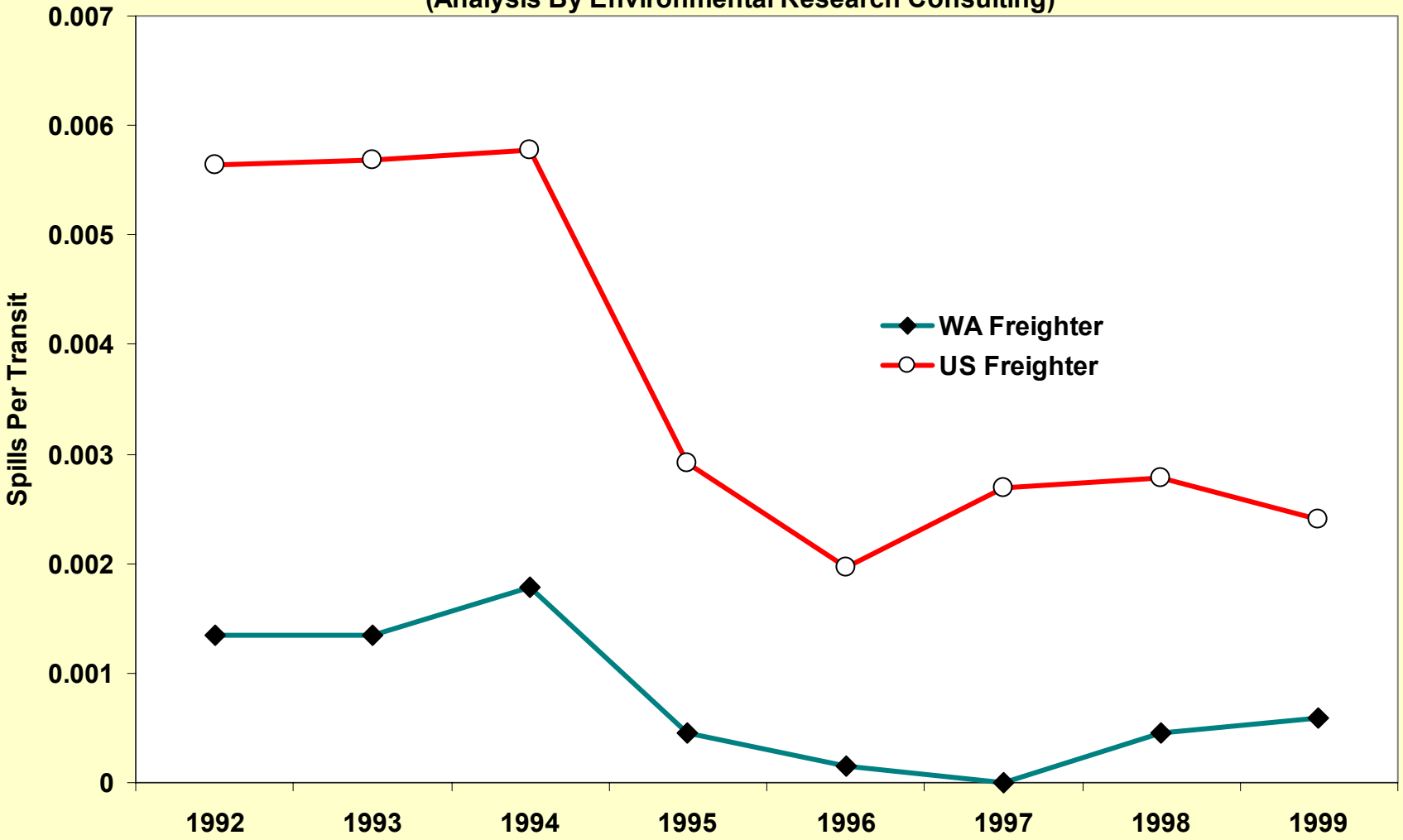
Oil Spills From Tankers Per Transit (1992-1999)

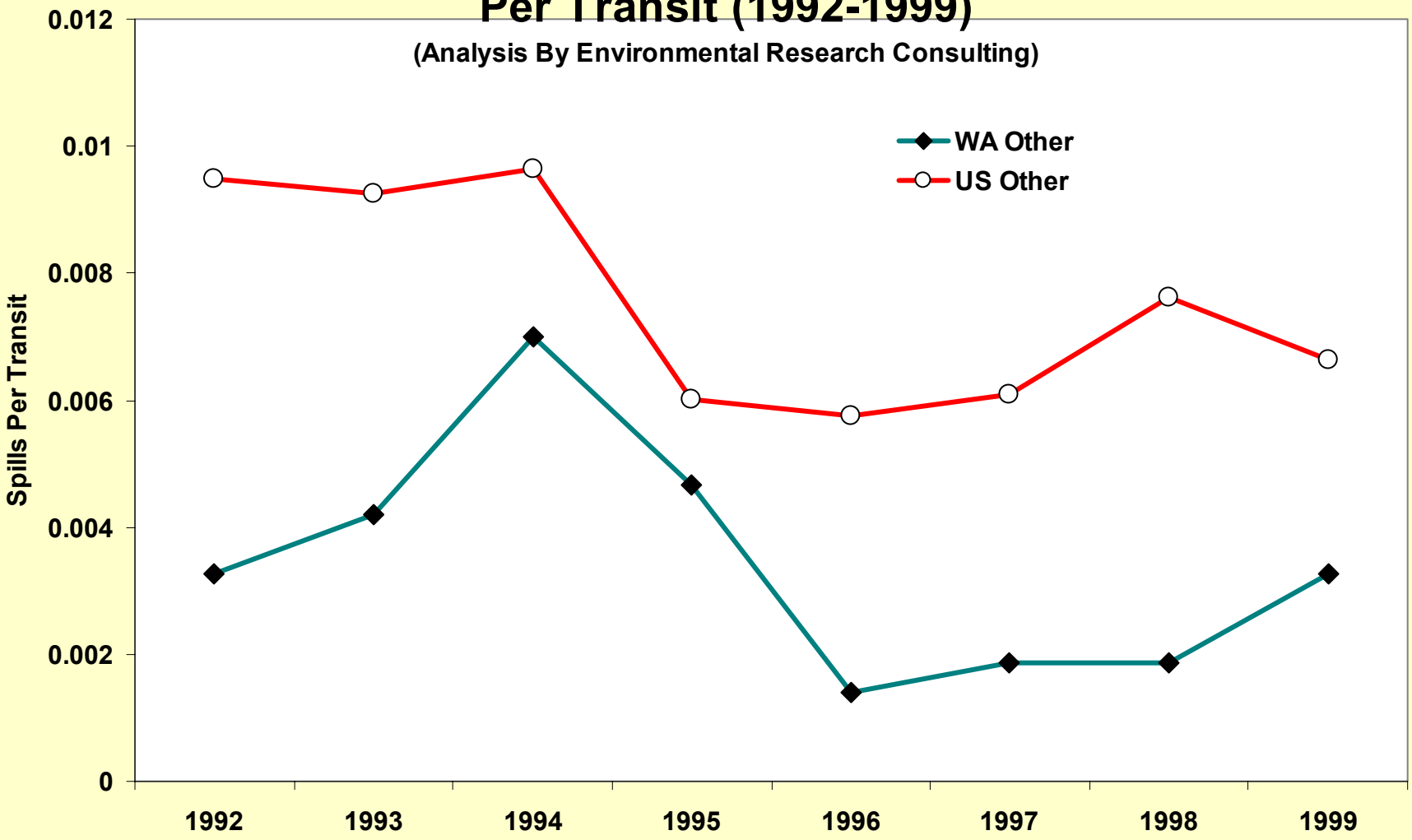
(Analysis By Environmental Research Consulting)



Oil Spills From Freighters Per Transit (1992-1999)

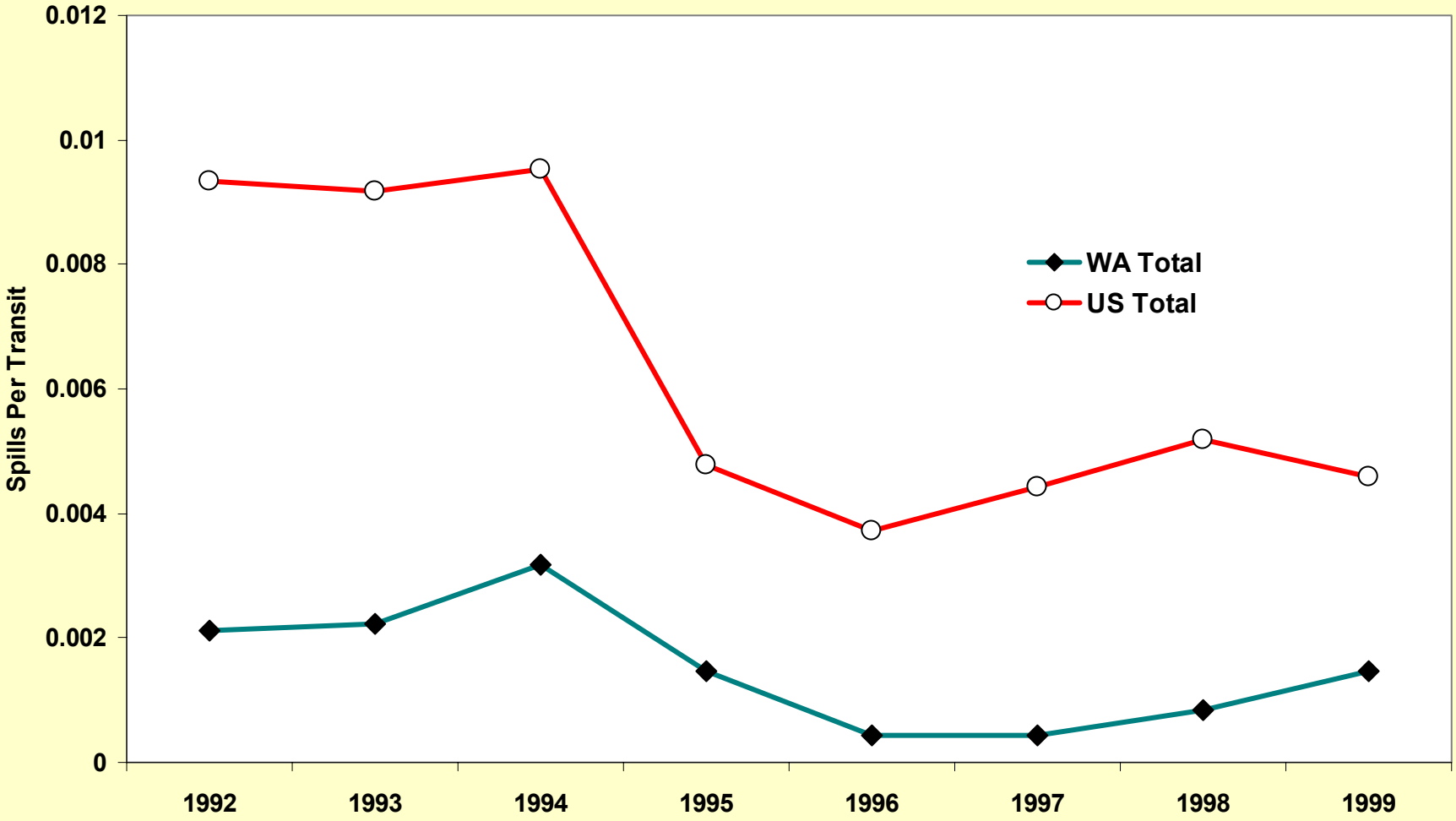
(Analysis By Environmental Research Consulting)




Oil Spills From Other Vessels >300 GRT Per Transit (1992-1999)
(Analysis By Environmental Research Consulting)
WA Other
US Other
Spills Per Transit
0.012
0.01
0.008
0.006
0.004
0.002
0
1992
1993
1994
1995
1996
1997
1998
1999

Oil Spills Per Vessel Transit (>300 GRT)(92-99)

(Analysis By Environmental Research Consulting)

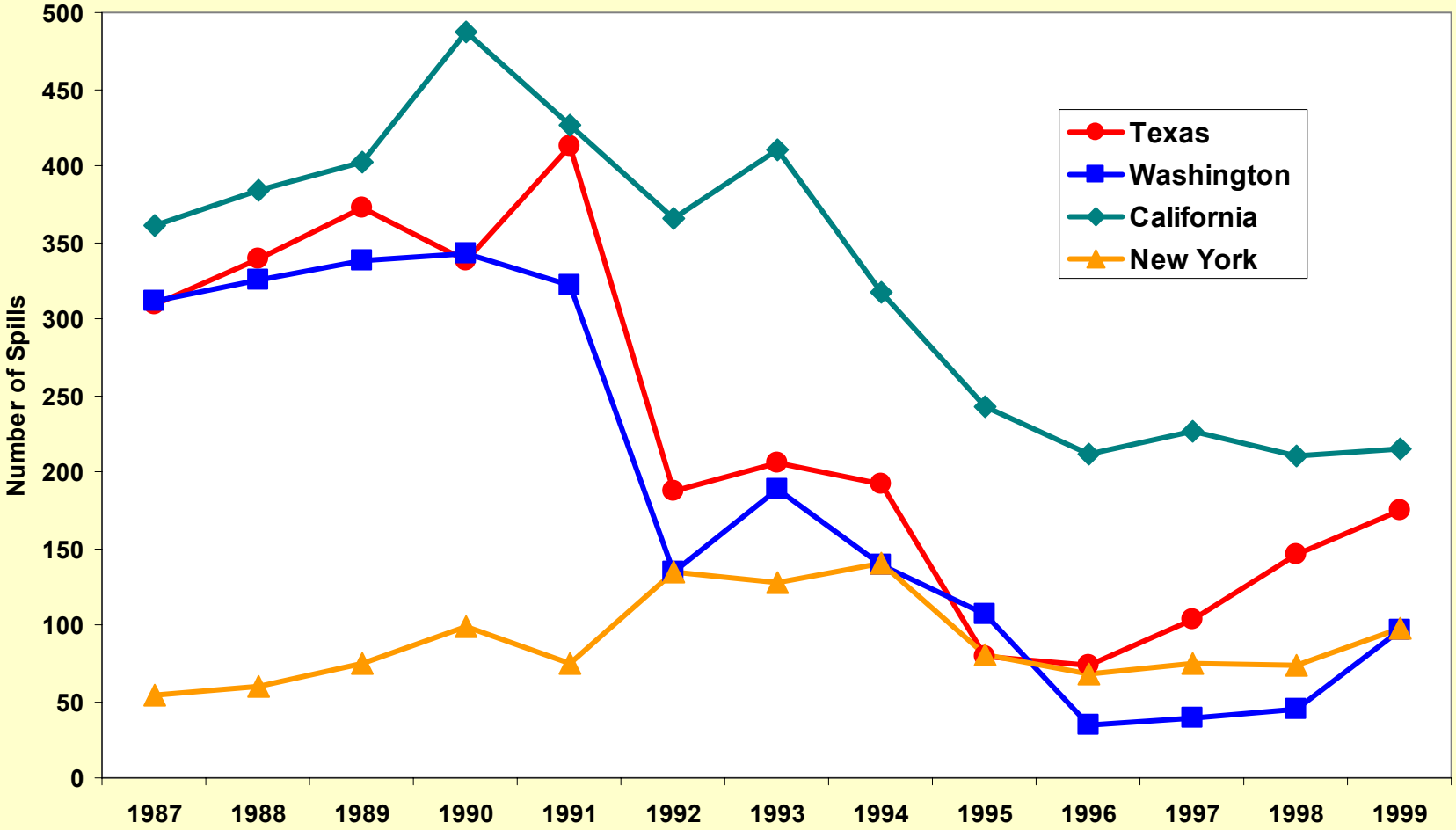


Washington State Spills Per Transit - Trends (1992-1999) Compared to US and States of Texas, New York, California				
Vessel Type	**Washington vs. California**	**Washington vs. New York**	**Washington vs. Texas**	**Washington vs. Total US**
Tankers/ Barges	No difference	***New York higher (p<0.05)***	No difference	***US higher (p<0.001)***
Freighters	No difference	Washington higher (p<0.01)	***Texas higher (p<0.01)***	***US higher (p<0.001)***
Other Vessels (>300 GRT)	***California higher (p<0.001)***	***New York higher (p<0.05)***	***Texas higher (p<0.001)***	***US higher (p<0.001)***
Total >300 GRT Vessels	***California higher (p<0.01)***	No difference	***Texas higher (p<0.05)***	***US higher (p<0.001)***

Percentage of Vessel Transits Resulting in Oil Spills

Vessel Type	Washington	New York	Texas	California	US
Tanker	0.25%	0.43%	0.19%	0.20%	0.79%
Freighter	0.07%	0.00%	0.25%	0.08%	0.35%
Other >300 GRT	0.35%	0.19%	0.08%	0.94%	0.73%
Total >300 GRT	0.14%	0.19%	0.18%	0.28%	0.59%

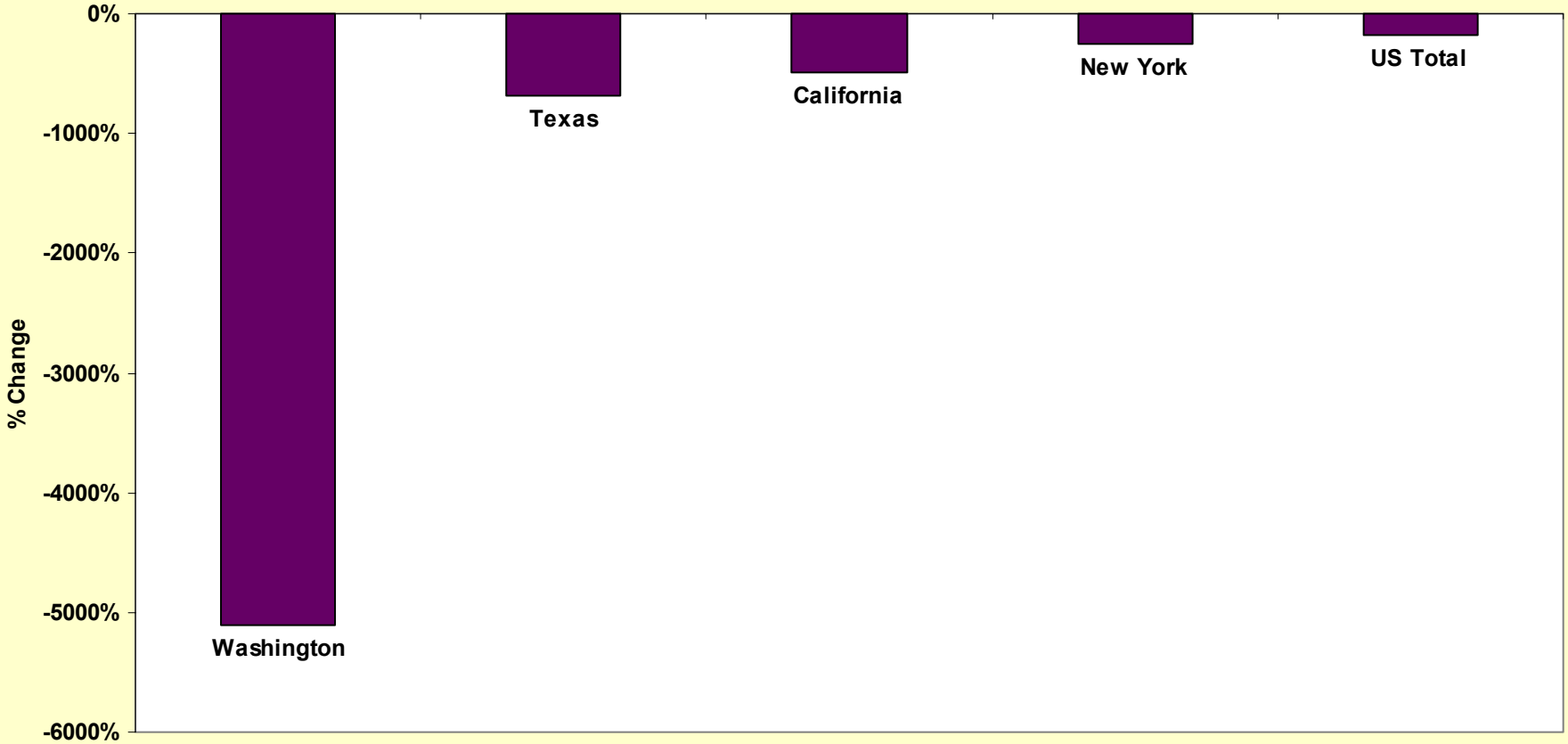
Number of Oil Spills From Vessels (87-99)
Washington, Texas, California, and New York



% Change - Number of Vessel Oil Spills

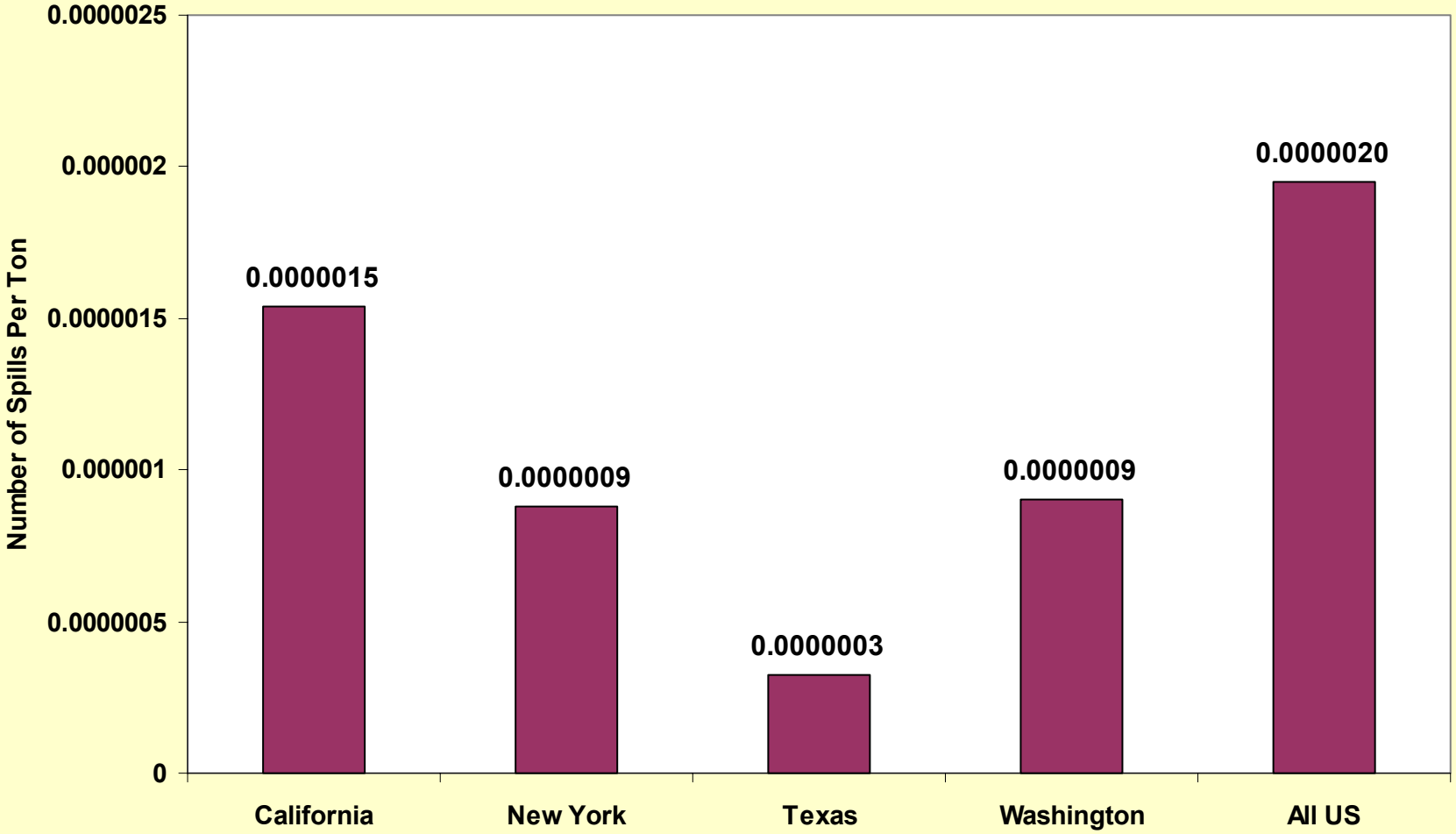
(25+ Gallons) (1987-1999)

(Environmental Research Consulting Database)



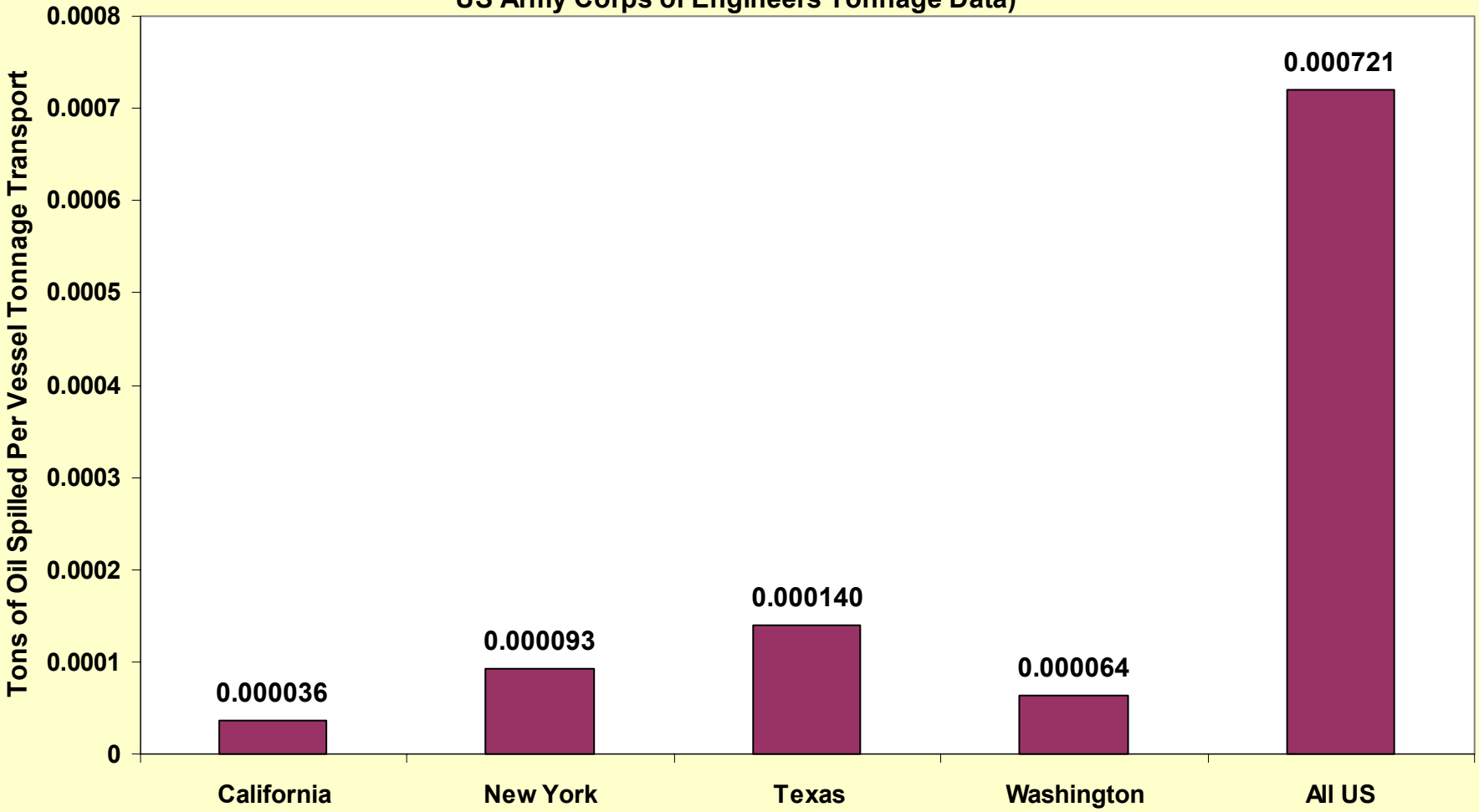
Number of Spills Per Tonnage Transport (93-99)

**(Environmental Research Consulting Database;
US Army Corps of Engineers Tonnage Data)**



Tons of Oil Spilled Per Tonnage Transport (93-99)

**(Environmental Research Consulting Database;
US Army Corps of Engineers Tonnage Data)**



Summary

- Concerted efforts by the Coast Guard, industry and Washington State have reduced the incidence of major oil spills in Washington State relative to other coastal areas of the United States.

Conclusions

- State regulatory efforts appear to be effective in reducing the risk of oil spills.
- The value of regional improvements to marine safety can be confirmed using existing data.

Conclusions - *Continued*

- It is difficult to demonstrate the value of spill prevention programs. The difficulty lies in the inability to count spills that have *not* occurred as a result of increased diligence on the part of the private and public sectors. However, it is clear from this study that spill prevention programs *do* work, and that the reduced frequency is not a reason for complacency.

Thank You for Your Interest

Dagmar Schmidt Etkin, Ph.D.
Environmental Research Consulting
750 Main Street
Winchester, MA 01890 USA
(781) 721-6795; etkin@environmental-research.com

ENVIRONMENTAL RESEARCH CONSULTING

&

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Jon Neel
Washington State Department of Ecology
Spill Prevention, Preparedness & Response Program
PO Box 47600
Olympia, WA 98504-7600 USA
(360) 407-6905; JNEE461@ecy.wa.gov